Quercus pyrenaica coppices: root/shoot imbalance caused by historical use?

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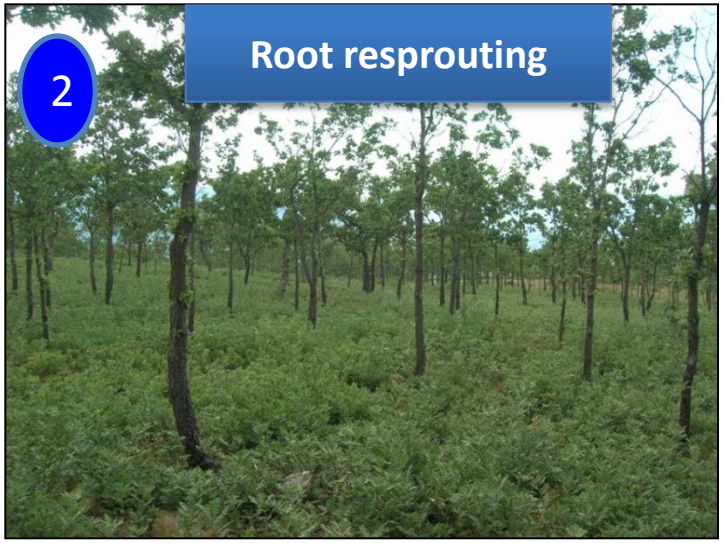
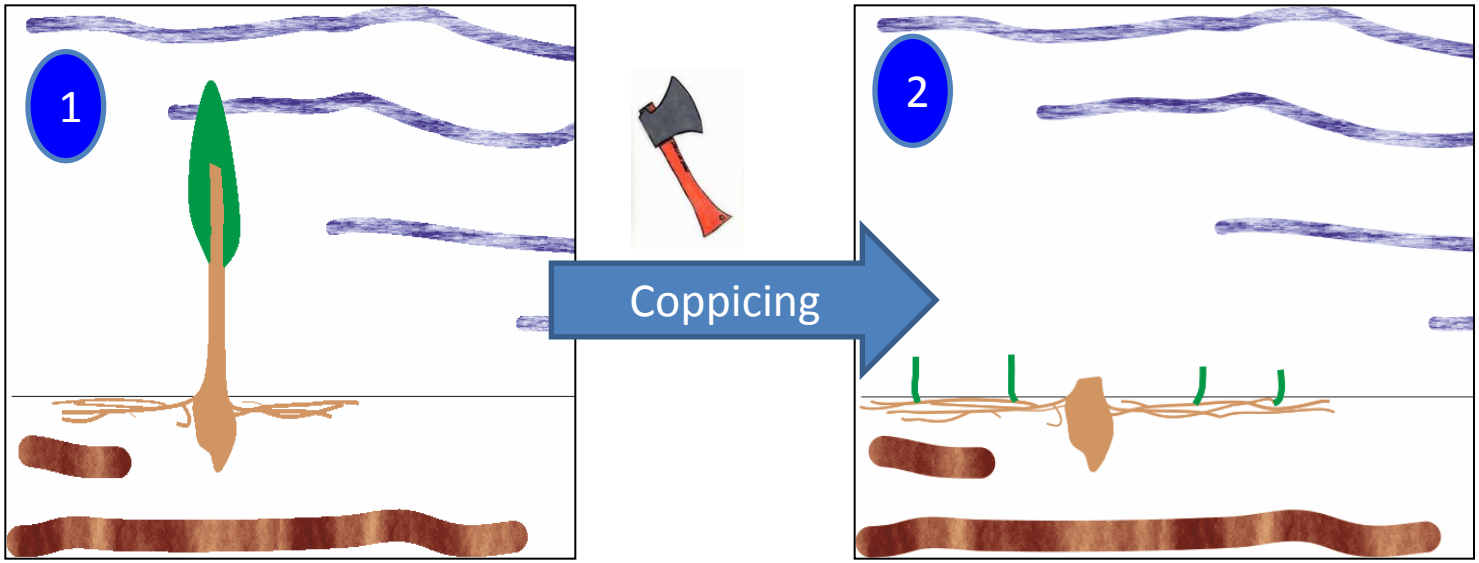
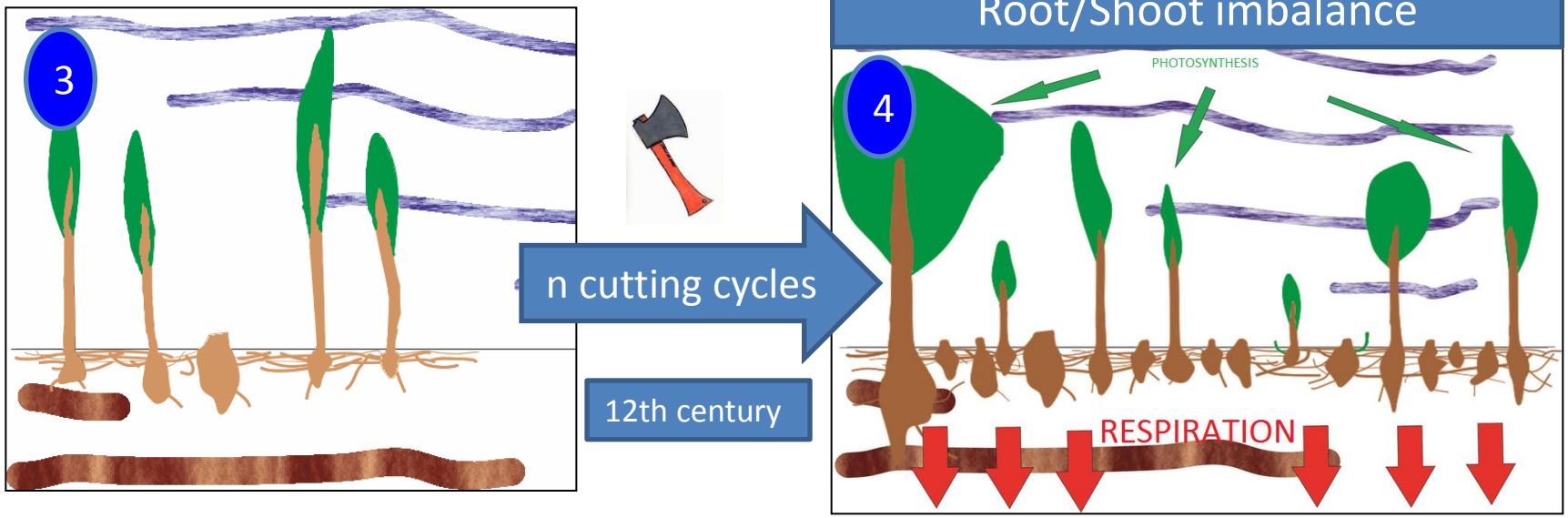
Introduction → Genetic structure & physiology → Root/Shoot imbalance

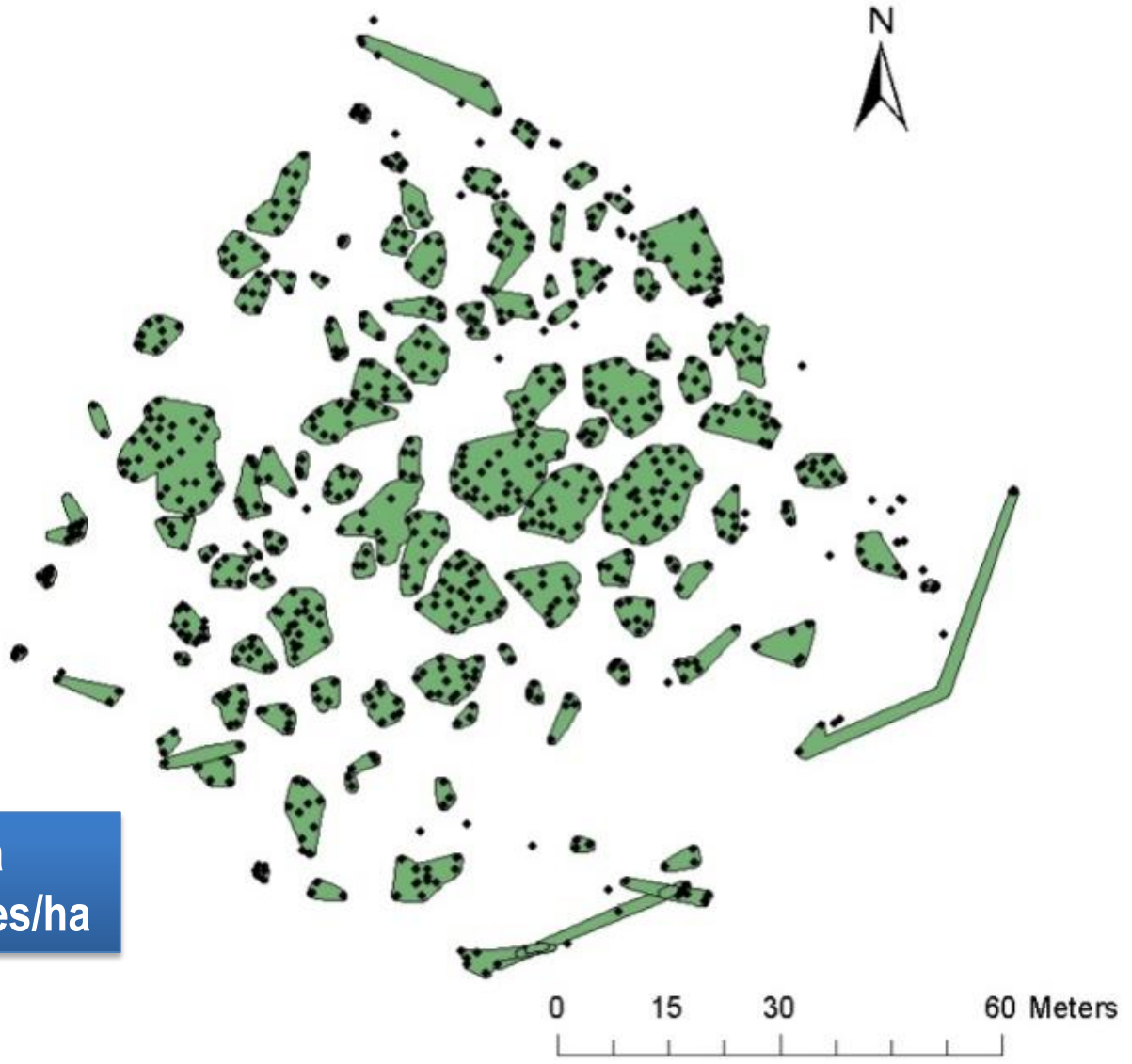


Introduction → Genetic structure & physiology → Root/Shoot imbalance





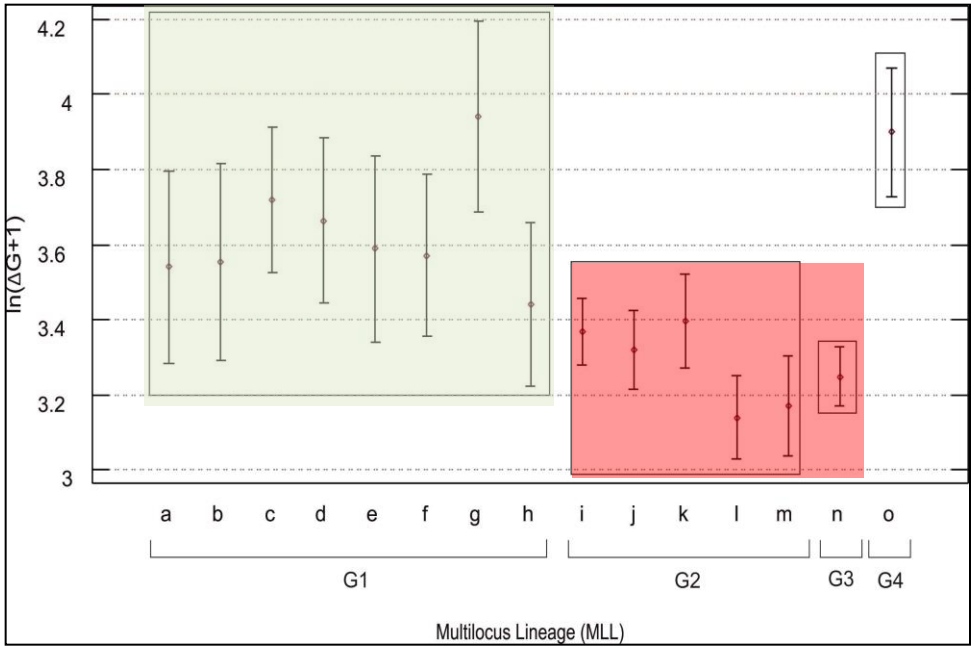
Genetic Analysis
Nuclear microsatellites



785 stems/ha
146 genotypes/ha

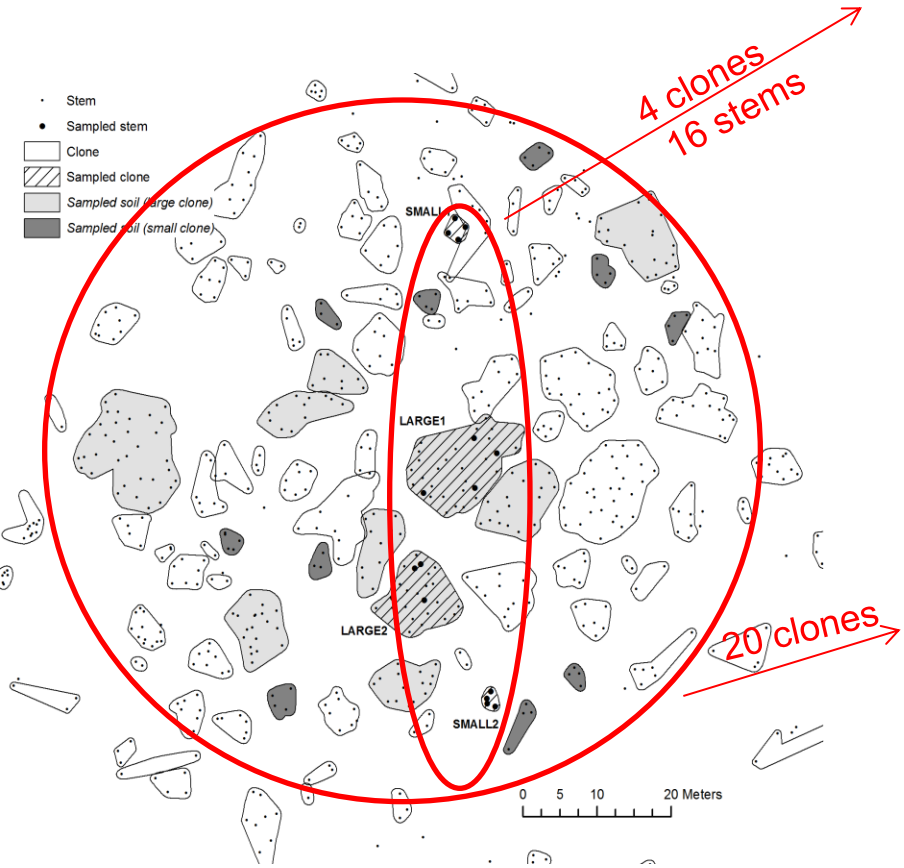
Does clonal structure influence stem growth?

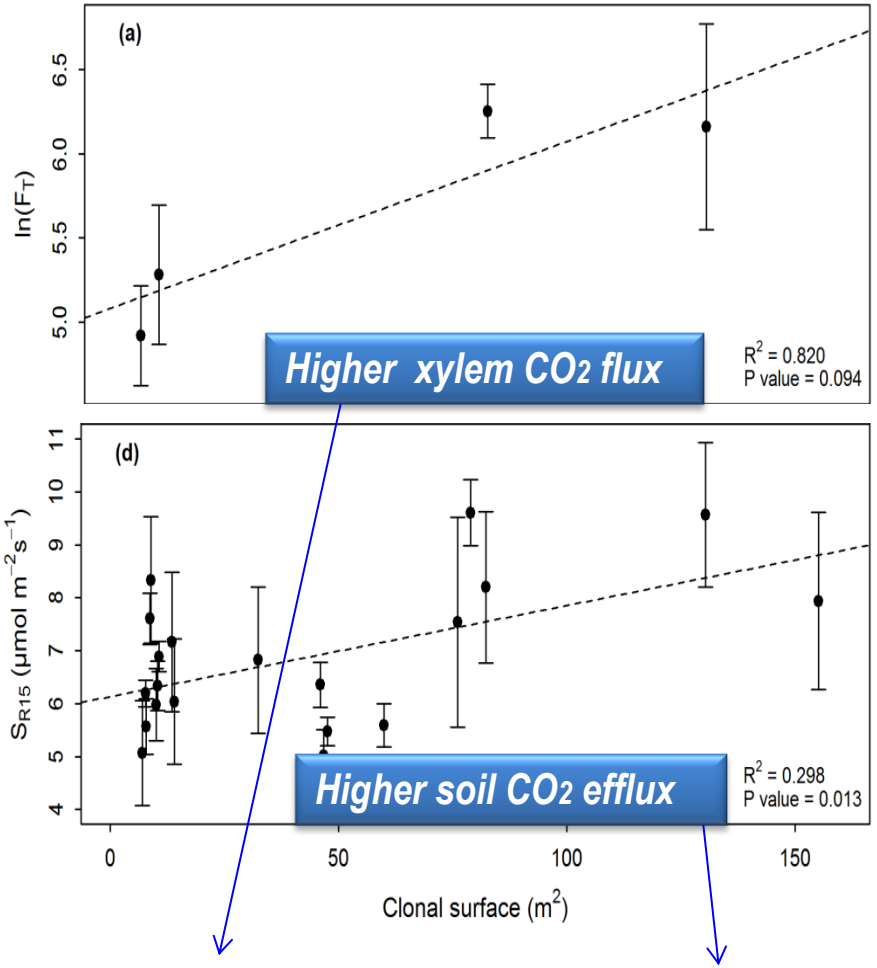
145 stems
15 clones



Large clones-> reduced stem growth

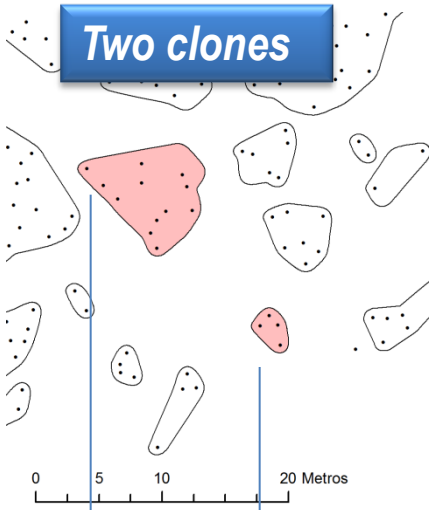
Does clonal structure influence root respiration per stem?





Increasing clonal size → Higher root respiration

Introduction → Genetic structure & physiology → Root/Shoot imbalance



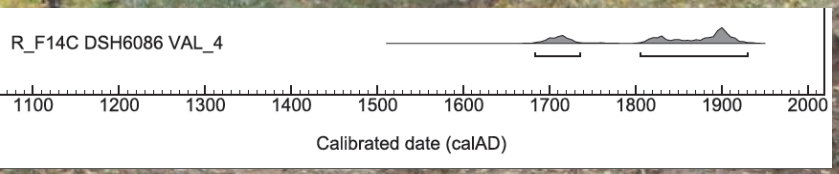
Small clone
(4 stems – 6 m^2)

Large clone
(8 stems- 55 m^2)

Root/Shoot imbalance??

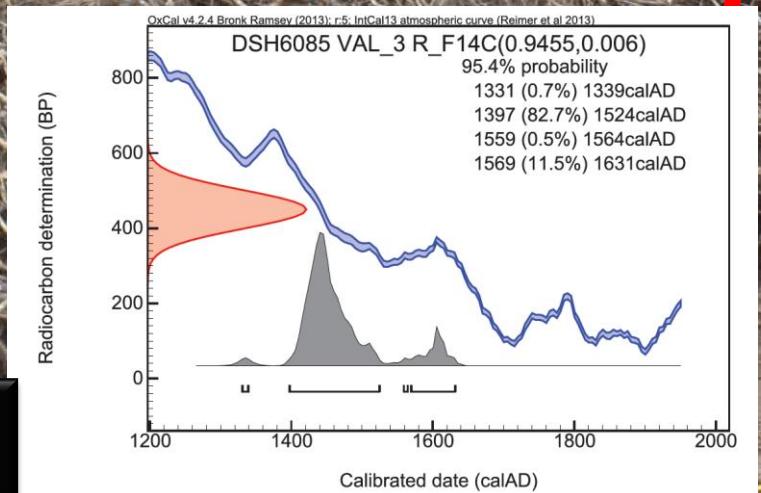
- R/S biomass
- R/S storage NSC pool
- Root age
- Root connections

Root age?



150 years-old

550 years-old



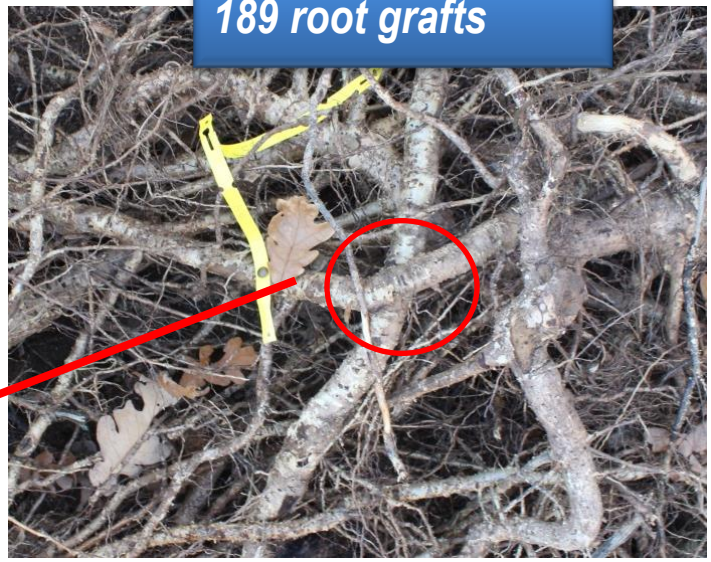
Root connections?

8 harvested stems

62 old taproots

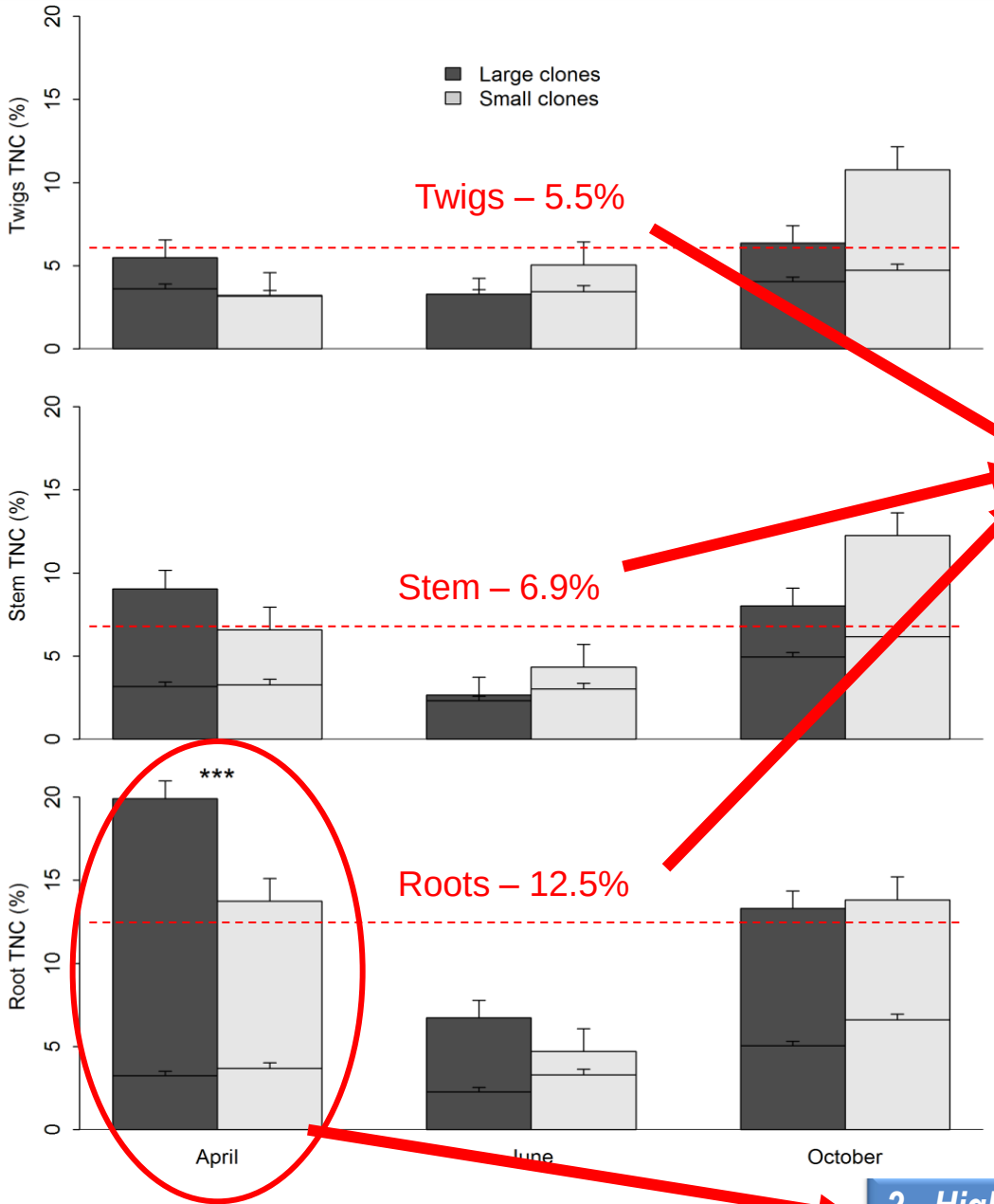
Large clone:
248 root connections

189 root grafts



59 parental root connections

NonStructural Carbohydrates (NSC) → Soluble sugars + starch

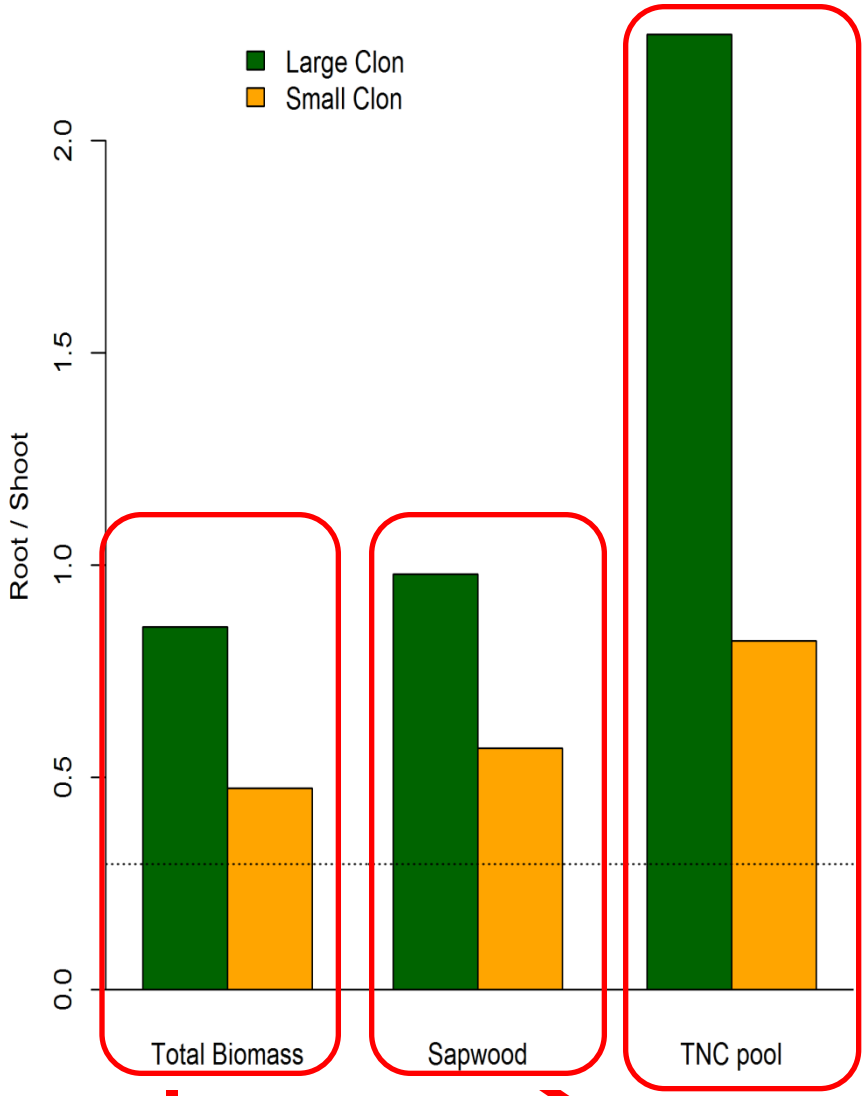


NSC - season
NSC - organs
NSC - clonal size

1.- Higher NSC allocation in roots

2.- Higher root NSC in large clone

Root / Shoot ratios



Shoot

Root

Stem growth – Leaf production

Reproductive effort

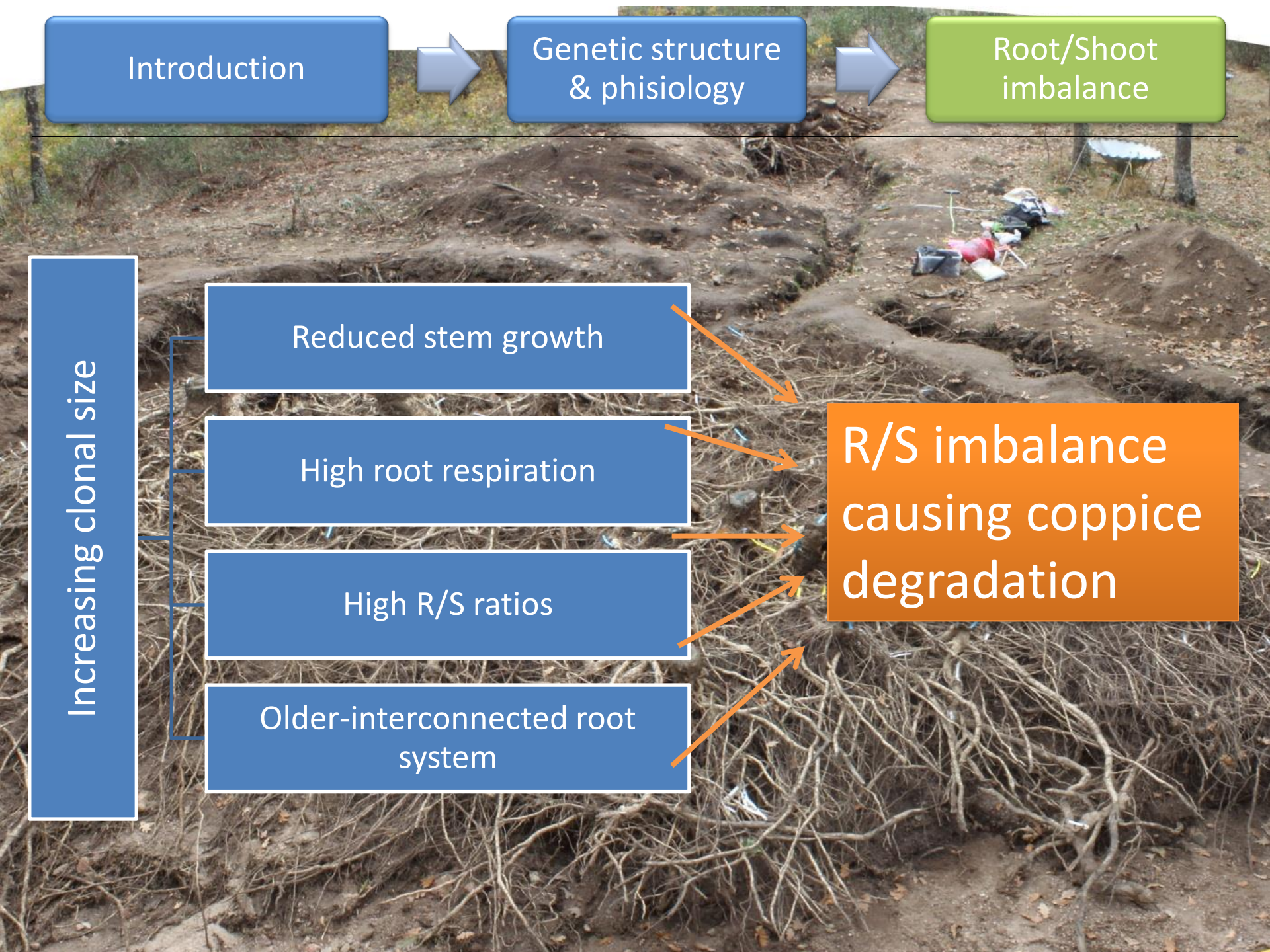
Growth

Resprouting

Respiration

R/S > 0.2 – 0.3 (temperate oak stands)
Root systems proportionally larger

Root system mantains functionality


Introduction
Genetic structure & phisiology
Root/Shoot imbalance
Increasing clonal size
Reduced stem growth
High root respiration
High R/S ratios
Older-interconnected root system
R/S imbalance causing coppice degradation

Thank you for your attention
Any question?

Technical University of Madrid, Spain
roberto.salomon@upm.es